

(12) UK Patent Application (19) GB (11) 2 269 333 (13) A

(43) Date of A Publication 09.02.1994

(21) Application No 9220484.1

(22) Date of Filing 29.09.1992

(30) Priority Data

(31) 9216747 (32) 07.08.1992 (33) GB

(71) Applicant(s)

Edward Greenwood
242, Broadway, Fleetwood, Lancashire, FY7 8BA,
United Kingdom

(72) Inventor(s)

Edward Greenwood

(74) Agent and/or Address for Service

Edward Greenwood
242, Broadway, Fleetwood, Lancashire, FY7 8BA,
United Kingdom

(51) INT CL⁵
B23B 49/00

(52) UK CL (Edition M)
B3B BHAB

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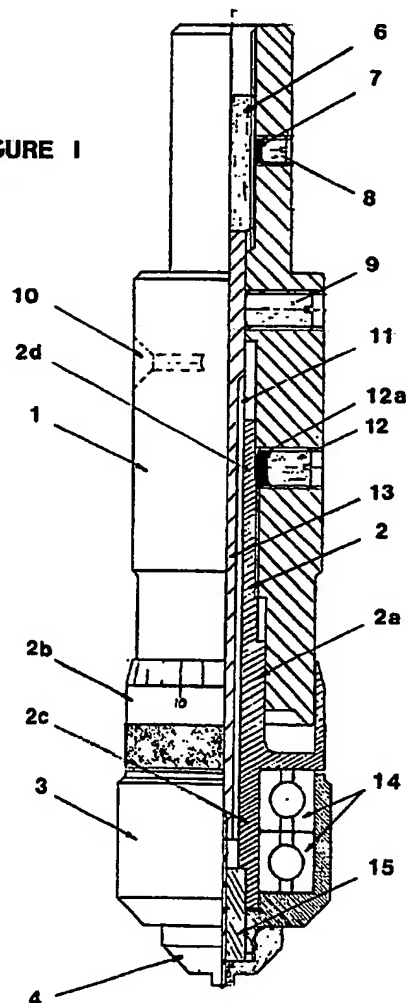
(58) Field of Search

UK CL (Edition K) B3B BHAB BHAX BHG , B3C
INT CL⁵ B23B

(54) A tool holder for precision depth drilling

(57) The holder includes a drill (13) secured in the body (1) by screw (9) and the cutting tip of this drill (13) is set level with the the end of the drill guide (4), a micrometer reading taken on the thimble (2b) enables a precise desired projection of the cutting tip to be determined. When the cutter has penetrated a workpiece to the full depth the drill guide (4) touches the material and the rotary depth stop (3) ceases to revolve. The adjuster (2), in which the thimble (2b) is a part, is locked into position by screw (12). A seal is placed between the drill guide (4) and the depth stop adjuster (2) to prevent cuttings entering the bearings (14). Cuttings are also cleared from the holder with compressed air via groove (11).

FIGURE I



GB 2 269 333 A

1/2

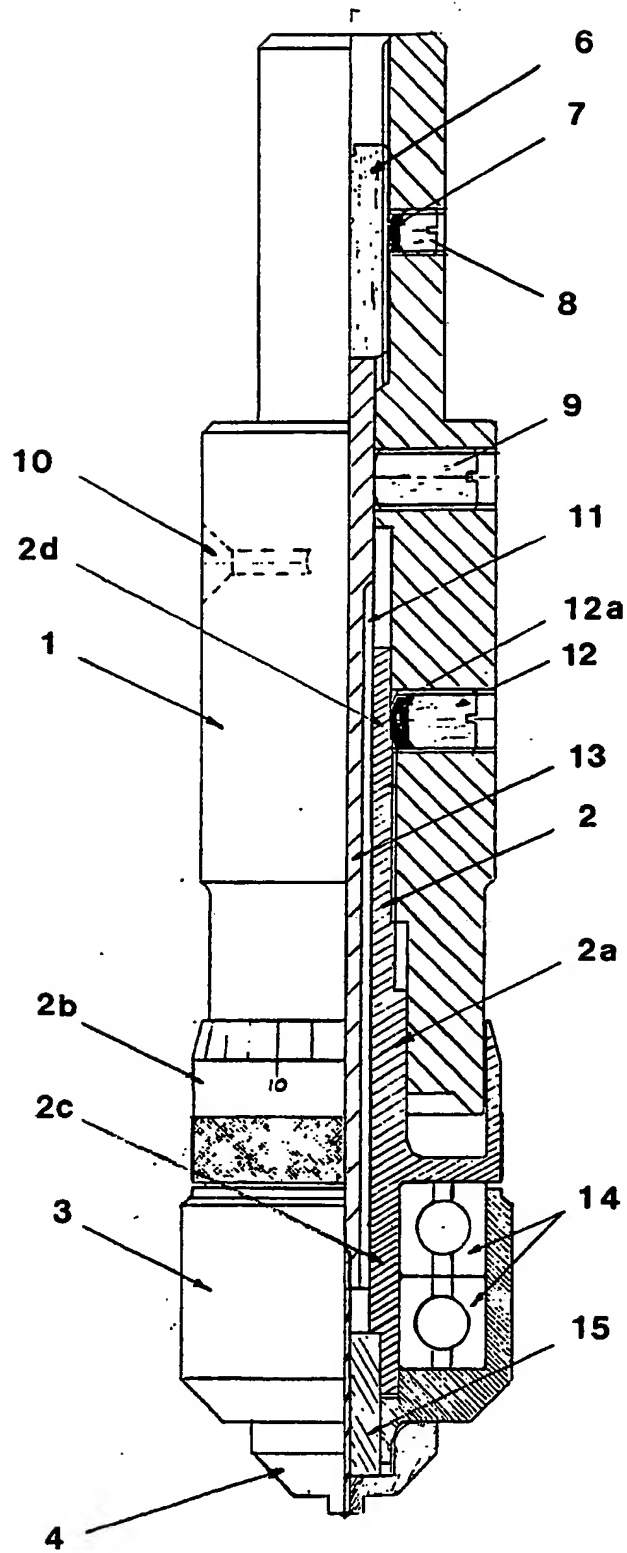


FIGURE 1

2/2

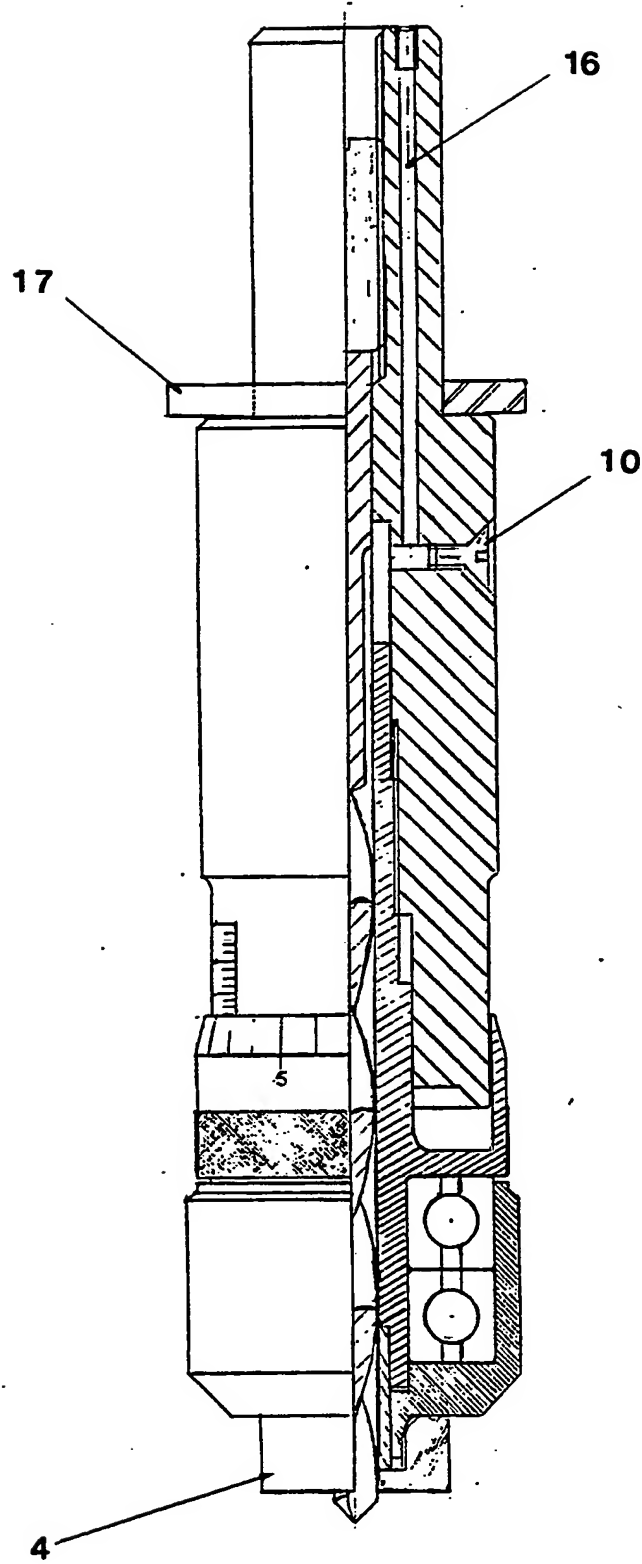


FIGURE 2

A TOOL HOLDER FOR PRECISION DEPTH DRILLING

The invention relates to three dimensional surfaces which, subsequent to machining, require small but precise adjustments.

There are a number of reasons why material may have to be removed from components with complex profiles after machining. For instance, errors can occur that cannot be economically rectified by re-machining, or in some cases material is intentionally left on for removal during a bedding process. If a surface profile is to be modified for any reason using hand tools, there is always a risk of removing too much material, rendering the component useless. To avoid irreparable damage, the normal technique is to make frequent checks, whilst cutting material away with hand tools. Due to the difficulty of judging precisely how much material is being cut away, caution dictates that very little material is removed before re-checking. As a consequence the process becomes a very time consuming exercise.

The solution is to be able to continuously monitor the depth reached while material is being removed. This has been achieved using the device and drilling groups of dimples to very precise pre-determined depths into the original surface. Then, by carefully removing material until all traces of the dimples only just disappeared; curved surfaces have been accurately modified in a single operation, without the need for numerous re-checks.

According to the present invention there is provided a drilling tool holder consisting of a cylindrical body, reduced at one end for gripping in a hand or machine drill chuck. At the other end is fitted an adjustable rotary depth stop, whose adjuster has a micrometer scale. This is used for determining the position of the rotary depth stop relative to the cylindrical body and a locking screw secures the adjuster to prevent it moving out of position once it has been set. An interchangeable drill guide fitted onto the end of the rotary depth stop provides radial restraint adjacent to the cutting edges of the drill bit. A seal is inserted between the drill guide and the rotary depth stop adjuster to prevent cuttings entering the bearing space. The drill bit is secured in the cylindrical body and prevented from moving axially by an adjustable end stop. A means of directing compressed air past the drill bit is provided for expelling cuttings from the device.

Specific embodiments of the invention will now be described by way of examples with reference to accompanying drawings in which:-

Figure 1 shows views of the device which is set-up for dimpling a metal surface with a small drill bit and for purging with an air nozzle.

Figure 2 shows views of the device which is set-up for depth drilling a soft material with a large bit and purged with a direct air supply.

The device as shown in Figure 1 comprises a cylindrical body 1, into which an adjuster 2, is screwed concentrically and axially and which also locates on a spigot 2a. The adjuster has a thimble 2b, with a micrometer scale for measuring axial movements relative to the cylindrical body. Once set, the adjuster is locked in position by tightening screw 12, onto the plastic pad 12a which presses against the spindle portion 2d, of the

adjuster. The rotary stop 3, is mounted on two ball bearings 14, on a shaft 2c, which is an extension of the adjuster. A drill bit 13, is secured in the cylindrical body with location screw 9, and prevented from moving axially by a drill end stop 6, which in turn is prevented from moving by a plastic pad 7, pressed against the end stop by a locking screw 8. An interchangeable drill guide 4, is screwed onto the rotary depth stop which in figure 1 has a small surface area seating in conjunction with a small diameter drill for use on hard material. The cutter shield 15, protects the ball bearings from the ingress of cuttings. The drill bit has a groove 11, cut down its side as an air passage between the nozzle entry point 10, and the cutting end of the drill.

The device as shown in figure 2 is arranged for depth drilling soft material using a large seating area drill guide and full size diameter drill. The nozzle entry point 10 has a plugging screw inserted and passage 16 has been opened for purging with a permanently connected air supply. A rubber washer 17 improves the air seal of the holder against the chuck end face.

CLAIMS

(1) A drilling tool holder consisting of a cylindrical body, reduced at one end for gripping in a hand or machine drill chuck. At the other end is fitted an adjustable rotary depth stop, whose adjuster has a micrometer scale. This is used for determining the position of the rotary depth stop relative to the cylindrical body and a locking screw secures the adjuster, to prevent it moving out of position once it has been set. An interchangeable drill guide fitted onto the end of the rotary depth stop provides radial restraint adjacent to the cutting edges of the drill bit. A seal is inserted between the drill guide and the rotary depth stop adjuster to prevent cuttings entering the bearing space. The drill bit is secured in the cylindrical body and prevented from moving axially by an adjustable end stop. A means of directing compressed air past the drill bit is provided for expelling cuttings from the device.

(2) A drill tool holder as claimed in claim (1) wherein there is provided an adjuster to the rotary depth stop screw threaded concentrically and axially into the cylindrical body.

(3) A drill tool holder as claimed in any one of claims (1) to (2) wherein the said adjuster is prevented from rotating when set, by a locking screw which presses a plastic pad against the spindle.

(4) A drill tool holder as claimed in any one of claims (1) to (3) wherein the said rotary depth stop is mounted on two deep groove ball bearings.

(5) A drill tool holder as claimed in any one of claims (1) to (4) wherein the said rotary depth stop has a detachable drill guide screw threaded onto one end.

(6) A drill tool holder as claimed in any one of claims (1) to (5) wherein the said drill guide is of varying proportions to suit the drill used and the material worked.

(7) A drill tool holder as claimed in any one of claims (1) to (6) wherein a plastic bearing seal sleeve is inserted between the drill guide and the rotary depth stop adjuster.

(8) The said drill tool holder claimed in any one of the preceding claims wherein the said drill bit is secured in the cylindrical body with a locking screw at right angles to the drill axis.

(9) The said drill tool holder claimed in any one of the preceding claims wherein the drill bit is restrained from moving axially in the device with an end stop screw threaded concentrically and axially into the cylindrical body.

(10) The said drill tool holder claimed in any of the preceding claims wherein the said end stop is locked in position with a plastic pad pressed against its side by a screw, threaded into the cylindrical body at right angles to its axis.

(11) The said drill tool holder claimed in any of the the preceding claims wherein the said drill bit has one or more air passages cut axially down its side

(12) The said drill tool holder claimed in any one of the preceding claims wherein a pluggable aperture is provided in the side of the cylindrical body for directing compressed air into the device and expelling cuttings when the drilling machine is stopped.

(13) The drill tool holder claimed in any one of the preceding claims wherein a pluggable aperture is provided in the chuck end of the cylindrical body for directing compressed air into the device to discharge cuttings when the drilling machine is either stopped or in motion

(14) A drill tool holder substantially as hereinbefore illustrated in the accompanying drawing.

-7-

Patents Act 1977

**Examiner's report to the Comptroller under
Section 17 (The Search Report)**

Application number

GB 9220484.1

Relevant Technical fields

(i) UK Cl (Edition K) B3B (BHG, BHAB, BHAX) ; B3C

(ii) Int Cl (Edition 5) B23B

Search Examiner

R HOWE

Databases (see over)

(i) UK Patent Office

(ii)

Date of Search

14 DECEMBER 1992

Documents considered relevant following a search in respect of claims 1 TO 14

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB 1405841 (ETABLISSEMENTS RECOULES)	1
X	US 4521145 (BIELER)	1
X	US 4507026 (LUND)	1

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Category	Identity of document and relevant passages	Relevant to claim

Categories of documents

X: Document indicating lack of novelty or of inventive step.

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